POLICY QUESTION
FOR
REVISIONS TO BACTERIA CRITERIA
IN VA WATER QUALITY STANDARDS

[4-27-07]

The Virginia Department of Environmental Quality (DEQ) has been working with the Virginia Department of Health (VDH) on developing amendments to the Virginia Water Quality Standards during the federal/state mandated triennial review.

The VDH has asked DEQ staff to inquire from Director David Paylor and Secretary of Natural Resources Preston Bryant for their position on one particular issue.

POLICY QUESTION: Should the bacteria criteria for freshwater in VA Water Quality Standards be revised based on an illness rate of 1%, which would be an increase from the existing 0.8% rate?

With this change in the illness rate, EPA guidance allows an increase in the primary contact recreational criteria as shown below:

Bacteria Criteria
[Colony Forming Units (CFU)/100 ml Water]

	Existing 0.8 % Illness Rate	**Proposed 1.0% Illness Rate**
Geometric Mean	**126**	**206**
Single Sample Maximum	**235**	**384**

Summary justification for using the higher illness rate in freshwaters is as follows:

- Consistent with EPA Beach Rule Guidance published in 2004
- Protective of primary contact recreation – EPA accepts either illness rate as protective of the swimming use
- Still below current illness rate for marine waters of 1.9%, which is the location for Virginia's most popular beaches
- Allows for attainable, more reasonable and more cost-effective TMDL clean up plans for impaired waters, including Combined Sewer Overflow impacted waters such as the James River in Richmond

Background: The existing VA Water Quality Standards contain in-stream water quality criteria for bacterial indicator organisms to protect the public from swimming related gastroenteritis illnesses. The criteria are derived using the Environmental Protection Agency studies that related the number of these types of illnesses to bacteria concentrations at bathing beaches around the country. At the time the existing criteria were adopted the acceptable illness rate for freshwater that was allowed by EPA was 0.8% (or 8 illnesses per 1000 swimmers). The resulting bacteria concentration at that illness rate was the criterion adopted into the VA standards. The acceptable illness rate is

a matter of policy and not based on science. These illness rates are described by EPA in the proposed Beach Rule as 'approximate and EPA's best estimates at the time.' (69 FR 41724, July 9, 2004).

Following adoption of the VA criteria, EPA published guidance that accepts up to 1.0% (up to 10 illnesses per 1000 swimmers) as a freshwater swimmer illness rate. The EPA guidance maintains the marine swimmer illness rate of up to 1.9% (up to 19 illnesses/1000 swimmers). The risk levels are different between fresh and marine waters because the illness levels seen at freshwater beaches did not exceed 10 illnesses, so an extrapolation higher than that cannot be justified without more study. It is not feasible to lower the marine waters illness rate to match the freshwater illness rate because the data from the marine beaches show that a risk level below 1.9% results in a criteria so low that it is unattainable.

Proposal: DEQ staff recommends changing the basis for the bacteria criteria from an illness rate of 0.8% to 1.0% in freshwater. This adjustment would be protective of primary contact recreation and would be acceptable to EPA. It addition, it seems reasonable given that the marine illness rate is almost twice the freshwater illness rate.

Management Impacts from the Proposal: Revising the criteria would have positive benefits for both the assessment and TMDL programs.

Based upon the current criteria, the 2006 Virginia Impaired Waters list includes 6,704 river miles as impaired for swimming use due to high bacteria levels out of 10,104 miles of assessed waters. Staff conducted a mock assessment to compare the number of stations that would be listed as impaired using the existing criteria [result = 61%] vs. criteria based upon the higher illness rate [result = 46%]. While there would be marginal [15%] decrease in the number of stations designated as impaired, the main benefit from the proposal is allowing for more reasonable and cost-effective management plans to attain the water quality standards.

To illustrate this benefit, staff has done some preliminary modeling efforts via the Total Maximum Daily Load (TMDL) program and found that the slight adjustment from 126 CFU to 206 CFU provides more reasonable, but still very challenging, bacteria reduction targets in some watersheds. For example, at the current level many watersheds must eliminate 100% of the bacteria loading to the watershed, including natural input from wildlife. This makes many TMDLs impractical to implement and, for stakeholders, undermines the feasibility of achieving standards and the credibility of the program. As illustrated in the following table, the suggested increase in the criteria allows for reasonable, but challenging, attainment compared to unrealistic bacteria loading caps.

Percent Reductions in Bacteria Loading from Source Categories Needed to Achieve Existing Criteria vs. Proposed Criteria

SOURCE CATEGORY	Lower Pigg River		Chestnut Creek		Northeast Creek	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Straight Pipes/Failing On-Site Systems	100	100	100	100	100	100
Livestock	100	80	65	0	100	98
Agricultural Runoff	100	0	98	76	100	86
Residential/Urban Runoff	100	0	98	78	100	100
Wildlife	30	0	0	0	92	86

Under the proposed criteria, a more cost-effective mix of approaches can be relied upon to achieve standards. Generally, direct inputs of bacteria, from straight pipes and livestock in streams, are primary implementation targets because of human health concerns and relative ease of corrective action. Reductions from runoff are more difficult to control and expensive to treat due to the large areas affected and diffuse nature.

While the cost of installing reasonable, generally accepted BMPs is considerable, the cost to install BMPs to the level and the type needed to fully attain existing criteria add significant costs, even if they could be installed. **For example, in the Fauquier County TMDL Implementation Plan [a total watershed size <100,000 acres] the estimate for installing reasonable BMPs is $13 million over 5 years, while the cost for the additional BMPs to meet current criteria is estimated to be another $53 million, an increase by a factor of at least 4 for little, if any, benefit.**

DEQ and DCR staff believes that the cost for restoring many impaired waters to the existing criteria is not reasonable or cost effective. Realistically, many stakeholders will be reluctant to participate in taking management actions to achieve an unreasonable standard. This would make many of these watersheds candidates for a secondary contact use designation with bacteria criteria 5 times higher than the existing primary contact criteria. If the Commonwealth had a more reasonable primary recreation criteria there would be less incentive for pursuing secondary contact designation in these waters.

At many public meetings during TMDL development, citizens and stakeholders state they want to do what is right to clean up their local rivers. However, they also commonly question the feasibility and high costs to achieve the current bacteria criteria, especially

since there are no readily available data demonstrating that Virginia citizens are reporting health concerns due to recreating in impaired waters.

Even without a statewide change to the new bacteria criteria of 206 CFU, the City of Richmond has proposed the need for the new number in the James River to implement their Long Term Control Plan for combined sewers. Capital costs needed to meet bacteria levels at the current criteria and risk level (126 CFU) will result in little improvement in water quality in the James River and at a very high cost (~$2 billion to meet existing criteria vs. ~$400 million to meet the proposed criteria.

Need for Coordination between VA Environment and Health Agencies: Prior to the VDH taking a position on the recommended adjustment to the illness rate they would like to know the DEQ Director and Secretary of Natural Resources are aware of the issue and supports the change. A concern is that it could be perceived by the public as a step in the wrong direction for water quality protection. Risk levels and illness rates can elicit reactions that are based on emotion and not fact and do not weigh the positive aspects of such a change.